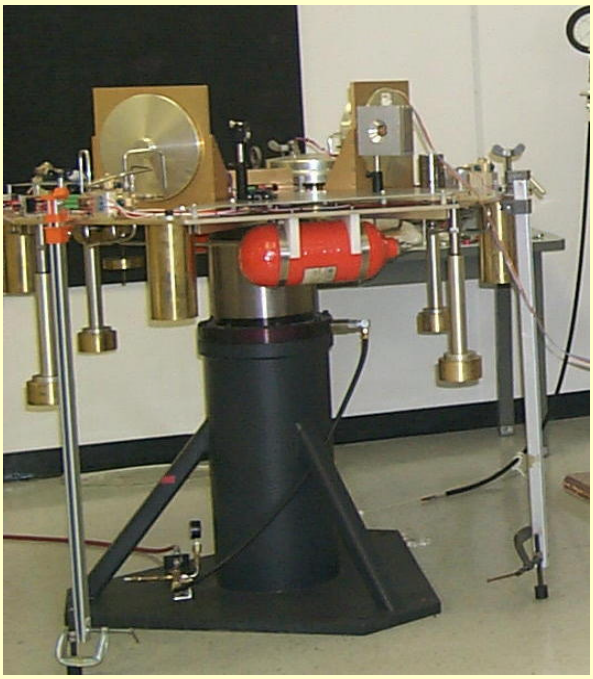
Spacecraft Research & Design Center

Department of Aeronautics and Astronautics

Naval Postgraduate School

Three-Axis Spacecraft Simulator



Objective: To develop and demonstrate real-time spacecraft attitude control algorithms.

- Spacecraft platform floats on a spherical air bearing and is free to rotate about the center point in 3-dimensions
- Motion is controlled by 3 reaction wheels and/or a system of 8 air thrusters
- Spacecraft sensors include 3 rate gyros, a 3-axis magnetometer and a 2-axis sun sensor
- On board laptop computer with Matlab/Simulink and Realtime Works provides the closed loop realtime control system.

Current Research

• Provides the spacecraft element of a new test bed designed for the Bifocal Relay Mirror spacecraft system developed for the NRO. The test bed consists of the NPS three-axis spacecraft simulator with beam tracking and control optics and fast steering mirrors provided by AFRL.

• The Bifocal Relay Mirror spacecraft is composed of two optically coupled telescopes used to redirect the laser light from a ground-based, aircraft-based, or spacecraft-based laser to distinct pints o the earth or in space for a variety of non-weapon, force enhancement missions.

• Experiments will be performed to validate the integrated control of the spacecraft and beam steering optics. The control objectives are for the spacecraft simulator to provide a stable platform for the fast steering optics which will be used to minimize beam jitter and also to track non cooperative moving targets.

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